Iodine Hall Thruster

Completed Technology Project (2014 - 2018)

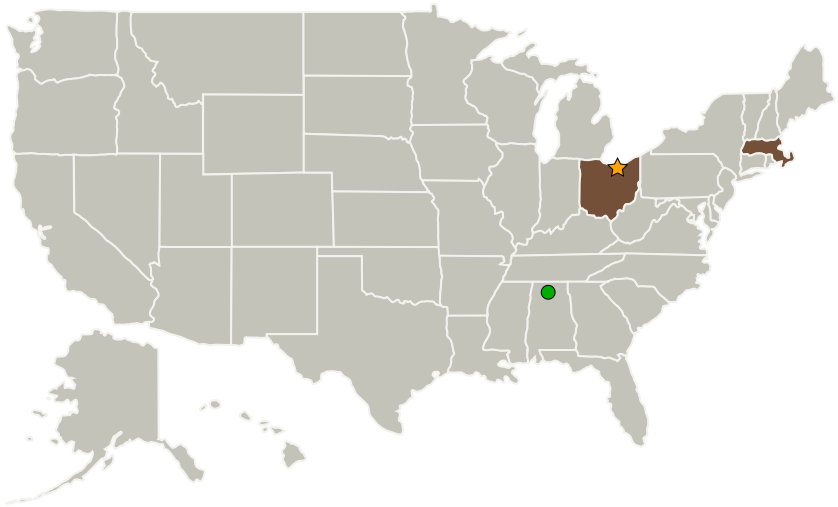
Project Introduction

The potential of an Iodine Hall system includes both enabling capabilities for SmallSats and game changing system level performance for higher power Hall systems. Typical nanosatellites are launched into prescribed low-earth orbits with no or limited onboard propulsion capability, this greatly limits their ability to achieve full mission objectives and/or safely deorbit. Iodine Hall thrusters are the best near-term option to solve this challenge given their low volume, high V performance, and unpressurized benign state prior to launch. Future NASA missions will be able to safely achieve far more technical objectives using this new propulsion technology on small sat missions.

Anticipated Benefits

Iodine Hall thrusters are the best near-term option to solve this challenge given their low volume, high V performance, and unpressurized benign state prior to launch.;Iodine Hall thrusters are the best near-term option to solve this challenge given their low volume, high V performance, and unpressurized benign state prior to launch.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Game Changing Development

Game Changing Development

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Organizations Performing Work	Role	Type	Location
Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
Marshall Space Flight Center(MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama

Primary U.S. Work Locations	
Massachusetts	Ohio

Project Transitions

October 2014: Project Start

July 2018: Closed out

Closeout Summary: Successful development of iodine electric propulsion systems will increase a satellite's velocity momentum for volume-limited small spacecraft over existing xenon systems. IHT developed the materials and design advancements required to enable iodine propelled small spacecraft and provide similar thruster performance with xenon. The project demonstrated that an iodine propulsion system using a xenon cathode can be matured and implemented in the near-term. The project identified several iodine development risks that remain open and need mitigation including feed system design, satellite deposit contamination, and operational procedures that would need to be demonstrated in space flight.

Links

Mission and System Advantages of Iodine Hall Thrusters
(http://ntrs.nasa.gov/search.jsp?R=20140012585)

The iodine Satellite (iSAT) Hall Thruster Demonstration Mission Concept and Development
(http://ntrs.nasa.gov/search.jsp?R=20140012578)

Project Website:

https://www.nasa.gov/directorates/spacetech/home/index.html

Project Management

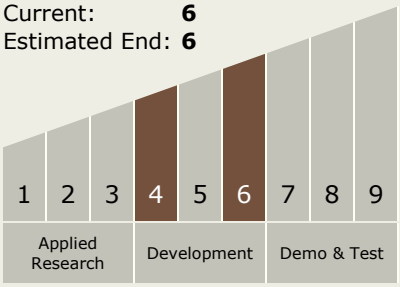
Program Director:
Mary J Werkheiser

Program Manager:
Gary F Meyering

Principal Investigator:
Timothy D Smith

Technology Maturity (TRL)

Start: **4**
Current: **6**
Estimated End: **6**



Target Destinations

Earth, Others Inside the Solar System